Reviews and Bibliographical Notices.

I.—ERB: SPINAL CORD.

KRANKHEITEN DES RUECKENMARKS. Von Wilhelm Erb, Prof. an der Universitaet Heidelberg. Zweite Haelfte, Band II. *Ziemssen's Handbuch d. Spec. Path. u. Therapie.* (Diseases of the Spinal Cord.) Pp. 382-404. Leipzig, 1876, 1877.

This volume, or rather these volumes, for the diseases of the spinal cord are published in three parts of which the above are two, has appeared in its English dress while we have been preparing this notice.

The only work with which this can be compared is Leyden's, and the plan of the two is very similar. Leyden's is, however, much more of a clinical work, wherein numerous cases are reported illustrating the various affections. The present work is more didactic, only a very few cases being reported. The clinical treatise will naturally appear more life-like, and will be the more attractive to many readers.

Erb has made a book with fewer pages and less upon a page than Leyden. Therefore it has been necessary to condense more and there has been less space for discussion. It would be interesting to trace the differences between these two works, which are really the only exhaustive treatises upon the diseases of the spinal cord in any language, but it will be sufficient to say that the anatomy of the cord is given less fully by Erb; the physiology is considered under such different points of view that the two are rather supplementary to each other. The general symptomatology is quite fully given by both. Erb is fuller in the part devoted to considering the general etiology, diagnosis and treatment. The diseases of the vertebræ, which are placed together in a separate chapter by Leyden, are considered under other heads by Erb, chiefly as the causes of compression of the spinal cord. Sclerosis, acute and chronic myelitis are more briefly treated by Erb; who has disposed very summarily of many disputed points, has stated concisely that which it is most important to know, and has not pretended to know more than has yet been discovered. It is really refreshing to read an author who acknowledges to limitations in both knowledge and curative skill, who evidently knows when he don't know. There is very little to criticize adversely; and one reason for this is that Erb limits himself so closely to a statement of what is

known or most generally admitted, indulging little or not at all in weaving theories or developing hypotheses.

A very clear and intelligible account is given of the minute anatomy of the spinal cord, both of the nerve structures and the interstitial tissue. He accepts the view of Gerlach, confirmed by Boll, that the fine net-work of nerve fibres unites in the grey substance with the finest divisions of protoplasm processes of the multipolar ganglion cells, and this fine net-work of nerve fibres is not only spread through the grey substance, but can be followed through the septa of the white substance even to the grey cortical layer. This we think is not yet fully proved, and are unwilling to accept until more light has been thrown upon the nature of the very fine fibres which help to form these septa.

A summary is given of the more important facts so far as the anatomy of the cord has as yet been settled; first, those which are tolerably certain.

That all or at least by far the greater number of the fibres of the nerve roots pass directly into the grey substance; this is true for the anterior roots at any rate, for a small part of the posterior roots perhaps not. That a large proportion of these radical fibres are united with the ganglion cells or their immediate processes; this likewise seems quite certain for the anterior roots, but is still doubtful for the posterior.

That in the antero-lateral columns, and especially in the lateral columns, numerous fibres leave the grey substance, turn upwards and run in the white columns toward the brain. The nerve fibres which leave the anterior grey pillars pass in part through the white commissure into the anterior column of the opposite side, and run in this probably to the brain; but they pass in part laterally into the lateral columns and run in this to the medulla oblongata, where they cross in the decussation of the pyramids. That also numerous fibres leave the posterior cornua, enter the posterior columns, turn upwards and pass towards the brain.

That the ganglion cells of the grey substance are united with each other in the most manifold way by numerous processes, not only in the posterior and anterior cornua of the same side, but also by means of the commissures with those of the other lateral half; that further, from these ganglion cells, processes pass directly into the nerve roots, and also into the white columns, and there take a vertical direction.

That the fibres which enter with the posterior roots, in part pass horizontally directly forwards, to be lost in the fine net-work of nerve fibres, or to reach the ganglion cells of the anterior cornua, but in part they run by the side of the posterior cornua upwards or downwards, afterwards to bend again and enter the grey substance. That by means of the fine net-work of nerve fibres, and the bundles of fibres springing therefrom, there is formed a most complete connection of the individual groups of nerve cells with each other, with the entering nerve

roots, with the white columns of both halves of the cord in transverse and vertical directions.

As more or less probably, but at present not yet certainly established, may be mentioned:

That after the radical fibres enter a certain ganglion cell, processes from this very cell pass directly into the white substance, (out of the anterior cornua into the antero-lateral columns, out of the posterior cornua into the posterior columns and the posterior part of the lateral columns), and in this run directly to the brain.

That separate fibres of the anterior and the posterior roots meet in certain cells within the grey substance.

That a few bundles from the anterior roots only pass through the grey substance directly to the anterior part of the lateral columns, and there bend upwards. Their significance is still uncertain.

That the fibres of the posterior roots first enter the fine network of nerve fibres of the posterior grey cornua, and are connected by means of this with the ganglion cells themselves.

That every individual ganglion cell by means of its branching processes passes into a fine net-work of nervous fibres, from which are then formed again medullated fibres.

That the net-work of nerve fibres in which the posterior radical fibres are lost is in continuous communication with the network of nerve fibres in the anterior cornua; furthermore, that from this net-work arise numerous fibres which cross the median line in the grey commissure to ascend towards the brain, partly in the vertical fibres of the posterior cornua, partly in the posterior columns. Hence the grey substance seems to be much more intimately connected with the tracts of the posterior radical roots (by means of the fine net-work of nerve fibres) than with the tracts of the anterior radical fibres.

That from Clarke's columns bundles of fibres pass outwards into the lateral columns.

That the medial parts of the posterior columns have by their development and structure a special significance, which, however, is still obscure. Pierret considers them to be great longitudinal commissures which unite different parts of the grey substance.

Physiologically, the conduction of touch, pressure, temperature, tickling and such impressions, Erb thinks, is by means of the posterior white columns, the conduction of the sense of pain by the grey substance. The anterior columns and the greater part of the lateral columns, have nothing to do with the conduction of sensation.

The isolated conduction of individual motor impulses, like that of the sensory excitations, is explained by the supposition that of the many channels which are open some offer less resistance, and therefore are usually selected. But even in this region many translations to other tracts (associated movements) occur, either because the normal paths are not sufficiently used, or be-

cause the resistance offered by other paths is diminished, or because the irritation is increased in force.

The centres of co-ordination are in the brain only; the corpora quadrigemina, optic thalami and cerebellum seem to take the most prominent part in the co-ordination of movement. There seem to be no such centres in the spinal cord, which contains only those paths of conduction that convey the co-ordinative impulses to the muscles. The location of these paths is at present unknown.

Erb says that the vaso-motor nerves for the most part are to be found in the lateral columns, they leave the spinal cord by the anterior roots. Leyden says they are in the anterior columns.

The phenomenon of tendon reflex is briefly but clearly described, and it is of interest both because this is a newly-discovered phenomenon and was discovered by Erb. The tendon of the quadriceps, and the ligamentum patellæ, the tendo Achillis, and the triceps tendon in the upper arm, are the best points for demonstrating these reflex actions, as yet only observed in man. They are caused only by mechanical irritation (light tapping with the finger or percussion hammer), are very easily distinguished from the cutaneous reflex actions, and are strictly confined to the muscles and groups of muscles belonging to these tendons. Similar reflex actions can be originated, at least in cases of pathological increase of excitability, from the periosteum of many bones, from fasciæ and articular ligaments. From the peculiar nature of this phenomenon and from experiments made by F. Schultze and P. Fuerbringer, he concludes that these muscular phenomena cannot be due to a direct action through the tendon, but depend upon a reflex operation, the mechanism for which, in the case of the lower extremity, is situated in the lower segments of the spinal cord; and lastly, that a reflex act originating in the skin cannot possibly be the cause.

The application of physiological data to the explanation of pathological phenomena is summed up in twenty-seven propositions. It would require altogether too much space to quote all that is of interest in the volume, and we must pass on.

Under general symptomatology there is an interesting discussion in regard to delay of sensations, which, so far as is yet known, is most frequently or exclusively noticed with respect to painful sensations, and seems to be dependent upon a narrowing of the grey substance.

In regard to paralysis he says the nature and distribution of the palsy are not very characteristic by themselves, but their combinations with other symptoms give many points which assist in an accurate localization. Paralysis rapidly followed by a marked degree of atrophy, and by the reaction characteristic of degeneration, points to disease of the anterior roots (rarely), or of the grey anterior cornua (more frequently). In this case all reflex actions are absent. Paralysis with tension and contracture of muscles, without atrophy, is very probably due to an

affection of the lateral columns. Paralysis without loss of reflex function and without atrophy points to an affection of the paths which ascend to the brain, outside of the grey substance, or at least outside of the ganglia of the anterior cornua. Such are mostly cases of circumscript disturbances of conduction, the end of the cord below the lesion remaining intact.

Paralysis with trophic disturbances gives room for suspecting an affection of the grey substance, since primary affections of the roots are very rare.

Very extensive palsy with much atrophy, the reaction of degeneration, absence of reflex acts, points to a widely diffused lesion of the anterior grey substance.

Paralysis in the districts of certain pairs of roots (*e. g.*, in those of the upper extremities alone, or both crural nerves, etc.), points to a strictly localized affection of roots or lesion of the grey anterior cornua.

The conclusions which are formed regarding the *nature* of the lesion in the cord, are far less certain than those relating to its *place.*

Ataxia is defined as not a real paralysis, but the disturbance of movement produced by defective co-ordination of the latter; and it may be produced by abnormal extension of the motor innervation to too many or too few muscles, so that in some cases more, in others fewer than are normally required, are put in use. By abnormal strength of the innervation sent to each muscle in the case of a complicated movement. Erb states that he has examined two cases of ataxia without any disturbance of sensation; touch, temperature, pressure, pain, sense of tickling, muscular feeling, feeling of position of the limbs, of passive movements, etc., were all intact. Due notice is taken of the fact that inability to walk or stand firmly with the eyes shut is not a symptom belonging to ataxia alone, but may be found also where there is marked disturbance of sensibility of the lower limbs; indeed, if there is no such disturbance in ataxy, tottering, with the eyes shut, may be absent. The whole discussion in regard to ataxia is well worth reading.

Tetanus he says is probably caused by an (inflammatory or toxic) affection of the grey substance, which enormously increases the reflex excitability. The same result would follow a diminution of the power of resistance to irritations, as has been suggested by Sydney Ringer and Wm. Murrell.

In speaking of trophic changes, and the wasting of muscular tissue in infantile paralysis, and progressive muscular atrophy, he says that observers are not agreed as to whether the change of the ganglion cells is primary, or whether it is the consequence of an interstitial myelitis. This is an example of the author's caution in not deciding disputed points too dogmatically. Possibly he has not weighed the evidence in these cases carefully enough to be convinced himself, and so he honestly states both sides without expressing an opinion. While this may seem like

a weakness to some, and while some would be inclined to express an opinion, one way or the other, sure that notable names could be quoted on either side, we think the course pursued shows the author's real ability, and that he is a safer guide to follow when he does express himself clearly and decidedly in favor of a theory.

The whole subject of degeneration of muscles and nerves as a consequence of lesion of the spinal cord, is ably considered ; but as several pages are devoted to this we cannot follow him closely and will only give his conclusion, that a paralysis, or destruction of the central trophic apparatus, or a separation from the peripheral parts, produces the symptoms of degenerative atrophy. Upon the whole, we are justified by the present state of our knowledge in assuming a disease of the anterior cornua, when the electrical examination shows the existence of the reaction of degeneration, and consequently of degenerative atrophy of nerves and muscles, provided the disease is clearly of spinal origin.

Erb takes a different view of the cause of bed sores (decubitus) from that held by many authorities. He considers that in disease of the spinal cord they are due to destruction and paralysis of certain parts, rather than to an irritation ; that they arise from the paralysis of certain trophic centres in the spinal cord, or the separation of these centres from the periphery ; it is only in certain acute cases that we cannot as yet entirely reject the prosence of an irritation as cause.

Changes in the renal secretion are very briefly mentioned ; the general opinion is mentioned that turbid and alkaline urine follow as secondary results of spinal lesion ; thus Rosenstein is mentioned as holding this view ; Charcot is referred to as holding the view that the spinal disease may be the cause of acute inflammation of the kidney. Erb seems to agree with Charcot, yet does not make it perfectly evident that he does ; but in the next subdivision he is more decided that the change is due to spinal lesion in many acute cases.

In considering the etiology of spinal disease, Erb does not agree with Leyden and many others, in the view that sexual indulgence and excess is of comparatively little etiological importance ; but he thinks that for many persons—not for all—the natural as well as the unnatural satisfaction of the sexual appetite, if carried to excess, forms an important disposing cause of disease of the cord, and enumerates as symptoms caused thereby, weakness of the legs, inability to stand long, tremor on making violent effort, pain in the back, shooting pains in the legs, loss of sleep, etc.

Masturbation may also cause serious spinal disease when long practiced. We are glad to see, however, that he also makes the statement that there is no reason to consider it more dangerous than normal coitus ; it is only when the practice becomes immoderate that there is danger of producing spinal disease.

"All this refers to the male sex. As to the female sex, very little is known as to these relations." Among women masturbation certainly has an injurious effect upon other portions of the nervous system, and so has excessive coitus, the brain and the general nervous strength suffer, but as Erb says, "I do not know that it causes a special disposition to spinal disease."

Under Diagnosis, the author makes the following very sensible remark, which may be kept constantly in mind with profit as teaching that skill in diagnosis can be acquired only by painstaking study of numerous cases, both clinically and pathologically. "It follows, therefore, that for a correct and sure diagnosis of a spinal disease, there must be not merely a very careful and exhaustive examination, not merely an exact collection and consideration of the etiological and other historical data; but also a comprehensive knowledge of the entire spinal pathology and a good share of personal practical experience."

Under "General Therapeutics" those remedies are considered which are most commonly used in spinal diseases. This method saves repetition in the subsequent sections, and is also of value as giving a comprehensive survey of the whole field, and laying a foundation for rational practice.

External applications are first noticed, including cold, warmth, baths, climate cures, electricity, blood-letting, derivatives, external frictions. Some of these are less understood in their application than they ought to be; it may be well, therefore, to dwell somewhat at length upon this section.

Both cold and warmth act in a reflex way through the cutaneous nerves; cold at first depresses, then reaction sets in; for the full effect of cold its application should continue over considerable time, not for only a few minutes. This point is not sufficiently dwelt upon. Warmth causes dilatation of blood-vessels and an increased flow of blood; tissue change is more rapid during its application; but over-stimulation and exhaustion may follow a too prolonged use of this agent.

Baths have not been systematically used here in America to such an extent as abroad, and so many ignorant persons have opened water cures that this method of treatment has not the repute it deserves. The direction for the use of baths is short but very satisfactory. Warm baths and cold water treatment are most fully considered; brine baths, chalybeate, mud and sea baths are more shortly noticed. In sending patients to the various baths, the temperature of the bath, the elevation above the sea level, the admixture of salts irritating to the skin, are all to be taken into account in coming to a decision. After mentioning a few principles which ought to help as guides, Erb remarks: "The *indications* which depend upon these effects cannot be easily decided. It is necessary to keep constantly in mind that there is present in spinal diseases an irritable weakness and exhaustion of the nervous system, and other organs than the

cord may be suffering in nutrition; otherwise the baths may result in injury to the patient."

It is especially in degenerative and sclerotic forms of chronic spinal disease that the greatest care seems necessary.

With cold baths a soothing effect is produced where the same portion of water remains in contact with the skin; an exciting effect when the body of water is frequently changed. Badly nourished, weak, irritable and anæmic persons, or those with degenerative disease of important organs, do not bear cold water treatment well.

Cold water strengthens the functions, improves the nutrition, increases the circulation of blood in the skin; it thus alters the distribution of the blood, and the process of circulation in the system; it relieves, at first temporarily, afterwards permanently, hyperæmia of internal parts; it quiets or excites the nervous system in various degrees; it tones the nervous system by the functional excitement and by the improved nutrition; it accelerates the process of change of tissue, and increases the total nutrition; it promotes resorption and formation.

If we add to this the effects which may be had from certain forms of baths, the increased sweating, the consequences of the increased consumption of water, the muscular movements which are necessarily increased, the effects of diet, climate, altitude in the case of cold-water cures, it becomes evident that we possess but few remedies which have so powerful and various an influence upon the nervous system.

Under climate cures it is said, that Beneke has shown that there is increased metamorphosis of tissue at the sea shore as compared with mountain regions.

A knowledge of the use of electricity would naturally be sought in special treatises on that branch of therapeutics, yet in eight or nine pages much information is given, but the hints are only hints, and do not furnish a complete guide to the use of electricity. The most valuable parts of this section are cautions as to how to apply the poles and the length of time and the frequency of the applications. We cannot, however, agree with the statement that "the principal object, in most cases, is to produce *as general and as powerful a passage of the current through the spinal cord* as is possible, especially in its diseased portions." (The italics are his.) A powerful current is too often injurious, and can only occasionally be used with safety.

He also says: "It is often well, after an electric treatment of several weeks, to interpose a considerable period of rest." This may be so if powerful currents are used, but some of the best results, essentially cures, we have obtained from long continued treatment without intermissions with mild currents.

"Manual skill, great technical experience, attention to a great variety of points, careful attention to the individual symptoms are absolute requisites."

He does not mention the method advocated by Brown-Séquard

of drawing rapidly over the back a *white* hot iron, or rather platinum bulb; a method of counter-irritation which has produced good results in the hands of many practitioners.

As to internal remedies he says, "We are still quite ignorant in regard to most of the remedies we employ, *how* they act upon the cord and its nutrition."

It is unnecessary to further specify the individual drugs; there seems to be nothing original in this section, except a praiseworthy acknowledgment of how little we know, which is refreshing as compared with the assumptions and assertions of some authors.

The second part treats of special diseases, beginning with hyperæmia of the membranes, of which little is known. "The anatomical evidence bearing upon hyperæmia in the spinal canal is very uncertain and ambiguous as possible." As to meningeal apoplexy, we think idiopathic cases are very rare, such at least as to give rise to symptoms sufficiently definite to lead to a diagnosis. Are the remedies advised, "energetic application of ice to the vertebral column, repeated powerful purges, and full local blood-letting (on the spine or anus)" really desirable? In the vast majority of cases the hemorrhage will have ceased before the physician arrives, the powerful purges, by causing effort and straining, would be likely to increase the blood pressure, and so start the bleeding again; the effort, the excitement of local blood-letting, would have the same tendency; the application of ice would have less of such effect, but it must be kept constantly applied; and if Chapman's views are correct, and he is quoted approvingly in a previous section, ice externally would lead to fullness of the internal vessels. It would seem that large doses of ergotin (fluid extract of ergot or its infusion might cause vomiting), and absolute rest, with opium if there is pain, is the best method of treatment.

In the introduction to diseases of the spinal cord itself, he says that he does not pretend to a strictly scientific division; his grouping of affections is, however, excellent and easily understood and remembered.

After enumerating the motor, sensory and other symptoms caused by spinal anæmia, he states: "We are not entitled to infer the definite existence of spinal anæmia from the above symptoms, unless the causes are clear." It seems to us extremely difficult to distinguish anæmia from spinal nervous weakness, which is subsequently described, or from a low sub-acute myelitis; thrombosis and embolism of small arteries may lead to softening and have the appropriate symptoms.

Spinal apoplexy is said to be as rare as meningeal hemorrhage. We think it is more rare; but minute hemorrhages into the substance of the cord, probably occurring during the agony, giving rise to no diagnostic symptoms, are not rare in inflammatory affections of the cord; but these do not constitute spinal apoplexy.

From the sixth division, concussion of the spinal cord, it might

be inferred that actions for damages following railway accidents are not common in Germany, if indeed they are allowable. As to the nature of such lesions he says that they are probably due to molecular disturbance; such anatomical changes as may be present in individual cases are accidental, and not essential adjuncts. We are inclined to believe his prognosis is rather too favorable.

It is not many years since German authors were unwilling to acknowledge that spinal irritation is a distinct pathological entity, claiming that it is merely one phase of hysteria. Erb, however, states that it is not to be confounded with the latter nervous condition, and gives it a place in his classification; yet he does not include in it all cases of tender spine, as so many authors are inclined to do.

In regard to the nature of spinal irritation, after giving the conflicting opinions of Ollivier, Hammond, Beard and Rockwell, Hirsch, he simply states that it is useless to try to decide between them, as the conclusion could only be that we know nothing definitely at present. This confession of ignorance is again refreshing after so much positivism to which the profession has been treated.

Section eight, functional weakness of the spinal cord—spinal nervous weakness—neurasthenia spinalis, is peculiar to this author, and is defined as a diseased condition in which marked and unquestionable disturbances of the functions of the cord exist, for which no considerable anatomical basis can be found or assumed; a disease, therefore, which must at present be classed among the functional disorders. It is most common among men, is caused by excessive mental efforts, sexual excesses, bodily over-exertion. Weakness and inability for prolonged exertion, dysæsthesia, paræsthesia, cold hands and feet, sleeplessness and general malaise are the prominent symptoms—a condition from which in this country quacks receive a large income, being able to work upon the fears of patients.

"We do not know at all what may be the nature of the processes of nutrition which cause the symptoms. We, however, believe that we are certainly entitled to locate them in the cord, especially the lower portion, the lumbar region. The most obvious view is that which supposes that the physiological fatigue of the nervous elements, which always occurs after severe and protracted irritation, becomes exaggerated and assumes a fixed form; in such a case we may suppose that the fatigue of the nervous elements does not become repaired in the prompt manner which is usual under physiological conditions."

Treatment consists in attention to regimen and diet, change to mountainous regions, electricity, iron and quinine.

The last sentences under treatment in myelitis need to be followed with some caution as to holding out false hopes to the patient, but contain a sensible caution to the physician not to discourage a patient too hastily.

"The courage of the patient must be maintained, his confidence in the various methods of treatment strengthened, and his hopes constantly aroused and reawakened. Unfortunately the physician must in only too many cases rest contented when he can succeed in this task, which is itself by no means a light one, and brighten the miserable existence of the patients by an occasional glimmer of fresh hope." It has been our experience that most of these patients are as conscious of their hopeless state as the physician, and before it is necessary to give an unfavorable prognosis are prepared by their own sensations of weakness and by the advancing disease to hear an unfavorable opinion. Also in many cases they are not especially despondent.

In section thirteen is described paralysis spinalis spastica—tabes dorsal spasmodique (sclerosis of the lateral columns?)—primary lateral sclerosis?—This is a division in spinal nomenclature only recently made. As in many other cases, a few scattered observations were recorded, the earliest in 1856, by Tuerck, the next by Charcot nine years later; a few others were recorded by Charcot and his pupils, until in 1875 Erb claims he first gave a full and detailed description of the disease. Since then there have been more frequent reports of cases.

There is motor paraplegia, generally developing itself slowly and gradually advancing upwards, to which symptoms of motor irritation early ally themselves—muscular twitchings, muscular tension, rigidity, and contractures, which lend to the disease-picture a peculiarly fertile character. To this is added a very striking increase of reflex activity of the tendons, much more rarely, also, of the reflex action of the skin, while there is an entire absence, at least for a long time, of any serious disturbances of sensibility, of the vesical or sexual functions, and of nutrition, and cephalic symptoms likewise never arise. Sometimes the disease begins in one leg and extends to the corresponding arm, at other times, more rarely, it begins in the arms. The account given is very full, and the whole series of symptoms is described twice, once briefly, again in more detail; being a newly described disease, this is perhaps excusable, but the first description is not brief enough for a general summary, and there seems to be an unnecessary repetition of the same ideas in nearly the same words with only a very little additional. The exaggerated tendon reflex, which may be so great that irritation of the ligamentum patella, or of the tendo Achillis, gives rise to clonic spasms (spinal epilepsy), is one of the most characteristic symptoms; this leads to a peculiar gait, which is described, but which no words can adequately describe. The absence of many symptoms is characteristic—no disturbance of sensibility, no vesical and sexual weakness, no muscular atrophy, no bed sores, no disturbance of brain and cranial nerve.

The "Theory of the disease" is a very careful and logical summing up of the reasons for considering that there is lesion of the lateral columns; this is a very satisfactory division, and the

author shows more conclusively than he is willing to admit that such is the lesion. Very few after such an array of proof would conclude. "But, unfortunately, we thus far lack conclusive reports of post-mortems. Until we have such, this assumption remains only a very probable one ; and, in view of the exceedingly vacillating character which still attaches to our physiological and pathological experiences concerning the spinal cord, we shall do well to await the definitive confirmation of this view before exchanging our clinical designation for an anatomical one." Since the above was written such a confirmation has been given, so far as one case is sufficient, by Stoffella in the *Wiener med. Presse*, No. 18, 1878.

Those cases accompanied with atrophy of the muscles, whether in children or adults, whether acute or chronic, are very properly described under poliomyelitis anterior acuta and chronica ; thus the pathology of these cases is indicated in the name, and uncertain division or classification dependent on symptoms is avoided.

But if every section, myelitis, sclerosis, bulbar paralysis, anomalies, etc., were noticed separately, this review would extend far beyond reasonable limits. Erb is cautious, sometimes too cautious, in expressing an opinion ; it is, however, better to be overcautious than over-bold. Any statement made has substantial foundations on which to rest. The few points on which we differ from him are comparatively unimportant. This part of Ziemssen's great work we can most heartily commend to any who wish to study the latest and most satisfactory treatise on diseases of the spinal cord.

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